



A Study of Severity and outcome of COVID-19 Second Wave

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Abstract : The second wave of COVID -19 is affecting most of the World. The Scenario is very grim in India. India is currently going through the 2nd wave of COVID-19 and the virus is said to be more infectious than it was previously. In this project work, we characterize the virus spread in the ongoing second wave in India, its variations, Vaccination its severity and outcome as well as study the dynamic evolution of epidemic of the pandemic. This study investigated the severity of the second wave in the local area and hospitalized patients in Kurnool district from March to August 2021. A total of 336 subjects (190 males and 146 females) were randomly selected with the help of questionnaire cum interview technique from the different areas of Kurnool district. All the subjects were fully informed about the purpose of the study. Data is given as numbers and percentage or means and standard deviation. During the study period SARS-Co-V2 infection, confirmed by RT-PCR. The second wave prevalence was seen significantly higher number in rural area, 120 (36%) cases were observed, in semi urban the number of cases were 108 (32%), in urban 102 (30%) but very few patients were belonged to slum area 06 (02%). The most relevant comorbidities were type 2 diabetes 102 (30%), cardiovascular disease 30 (9%). Renal problem was observed in 4 patients. In the present study more patients were admitted and suffered during the second wave, they were younger than first wave and there were more deaths in this area. The patients in the second wave presented renal and gastrointestinal symptoms more. Cardiovascular disease, diabetes as the major predictors of in hospital death. Second wave is greater infectiousness of the virus and greater transferability. Most of the areas in this Kurnool district, the entire families were getting infected from parents to children and vice versa. It is predominantly because the virus has changed its forms and it is coming with the advantage of being far more infectious, every other person has COVID in this second wave.

Index Terms - COVID -19 Second wave, symptoms, variants, comorbidities, vaccination.

I. BACKGROUND

WHO declared COVID-19 was pandemic on March-11-2020. Across the world SARS-COV-2 the deadly virus continues to disrupt public life since Nov 2019. Individuals infected with the novel coronavirus disease have shown a wide range of symptoms, from mild and moderate, to severe to critical virus is changing rapidly with the new variants due to mutations being discovered, newer and unusual symptoms infected are being noticed in recently infected patients.

Symptoms of covid-19 include- fever with or without chills, shortness of breath, cough, headache, body aches, sore throats, a loss of sense of taste or smell, nasal congestion, fatigue and muscle soreness.

India is currently going through the 2nd wave of COVID-19 and the virus is said to be more infections than it was Previously. It is important to all to be aware of the newest symptoms of covid-19 to be able identify should take homely treatment to COVID complications.

The second wave of COVID-19 in India has had severe consequences in the form of spiralling cases reduced supplies of essential treatment and increased deaths particularly in the young population. India over population and poor execution of a coherent containment strategy and policies have allowed a substantial number of viral mutations to persist in the environment. The SARS-COV-2 double mutant strain B.1.617, possessing the key structure mutations Glu484Glu and Leu452Arg in the spike protein, is highly infectious and less affected by current vaccine responses, and is a central cause of the COVID-19 surge. (1,2).

II. NEW SYMPTOMS OF THE COVID-19 SECOND WAVE INFECTION

Along with the common symptoms fever, cold **COUGH**, shortness of breath or difficulty in breathing (dyspnea), is one of the early symptoms of coronavirus, predominantly seen in infected patient during the second wave of covid-19.

The intensity of breathlessness can vary among individuals, this symptom leaves most patients with a feeling of tightness of the chest, resulting in the content gasping air, every few seconds.

Other new symptoms also seen in the patients

- Gastrointestinal tract infection, include loss of hunger vomiting, abdominal pain and loose stools.
- Hearing loss is one of the symptoms in the second wave of COVID-19 infection, it may range from mild moderate to severe which results in sudden hearing loss, impaired hearing or ringing sound in ears (tinnitus). This starts early in the first week of infection and resolves over a period of time.
- Extreme lethargy and weakness have been reported as one of the early symptoms of the COVID-19 infection, more so during the second wave. When the body identifies the COVID-19 virus as an invader it initiates the immune response to fight the virus. And this can result in the infected person feeling forward and weak.
- Pink eye is an infection of the eye which results in the swelling of the outer transparent membrane (conjunctive) of the eyelid and eyeball common symptoms include itching redness. and tearing the eyes. Conjunctivitis with covid-19 is seen predominantly in one eye. It may be accompanied by constant eye irritation and sensitivity to light.
- Dry mouth or not enough saliva:
Saliva is the watery. Brothy substance produced in the mouth that helps in dissection and keeps teeth and mouth moist and healthy. When sufficient saliva is not produced by the salivary glands leads to a condition called dry mouth, which can lead to tooth and germ diseases and make susceptible to infection virus can attack the tissues and mucus lining of oral cavity, resulting in decreased saliva production and thus, cause dry mouth, like the dry mouth, other oral manifestations of the coronavirus infection could be dry tongue, changes in the colour and texture of the tongue sores or blisters and difficult in eating.
- Diarrhoea or loose watery stools is one of the widespread symptoms seen in covid-19 patients during the second wave most individuals affected with covid-19 complained of persistent diarrhoea for 1 to 14 days, with average duration of 5 days.
- Headache can be a symptom of covid-19 a normal headache that continues for a long time and does not subside with painkillers.
- Skin rashes have highlighted skin rashes as a new symptom of covid-19 patients have reported rashes on their hands and feet, which are usually called acral rashes, these rashes can develop as a result of the immunological response to the virus.

Many people have feelings tired and fatigued prior to developing any other symptoms. In fact, in some cases people don't have any other symptoms other than feeling fatigued and tired.

The severity of covid-19 symptoms can range from very mild severe some people may have only few symptoms and some people may have no symptoms at all. Some people may experience worsened symptoms, such as worsened shortness of breath and pneumonia about a week after symptoms start old age people have a higher risk of serious illness from covid-19, people who have existing medical conditions also may have a higher risk of serious illness. Such as heart failure, corona artery disease or cardiomyopathy, chronic obstructive pulmonary disease (COPD), cancer, type 1 or type 2 diabetes, overweight, obesity, high blood pressure smoking chronic kidney disease, asthma, pulmonary fibrosis, liver disease etc. (3,4)

Data has shown that spreads mainly from person to person among those in close contact. This virus can spread by a person being in the close contact. This virus can spread by a person being exposed to small droplets or aerosols that stay in the air for several minutes or hours- called air borne transmission, being coughed or sneezed on by an infected person severe medical and lead to death in some people older adults or people with existing medical conditions are at greater risk of becoming seriously ill with covid-19. Complications can include.

Pneumonia and trouble breathing, organ failure in several organs, blood clots, additional viral and bacterial infection. A severe lung condition that causes a low amount of oxygen to go through blood stream to organs.

III. MATERIALS AND METHODS

We conducted prospective study of all local areas of Kurnool district Andhra Pradesh, hospitalized from March to August 2021 in the second wave. The project was completed within a period of six months, SARS-COV-2 infection was confirmed by RT-PCR using swab samples from the upper respiratory tract (Nasopharynges/oropharyngeal exudate) from the lower respiratory tract sputum (endotracheal/bronchi alveolar lavage/bronchial aspirate). Tests were carried out with the VIASURE SARS-COV-2 Real time PCR detection kit.

IV. OBSERVATIONS AND RESULTS

Table 1: Gender Percentage

S.No.	Gender	Subjects n=336	Percentage
1	Male	190	57%
2	Female	146	43%

Figure 1

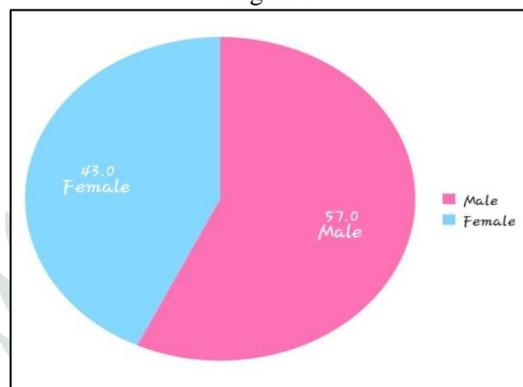


Table 2: Area Wise Distribution

S.No.	Area	Subjects n=336	Percentage
1	Slum	6	2%
2	Rural	120	36%
3	Semi urban	108	32%
4	Urban	102	30%

Figure 2

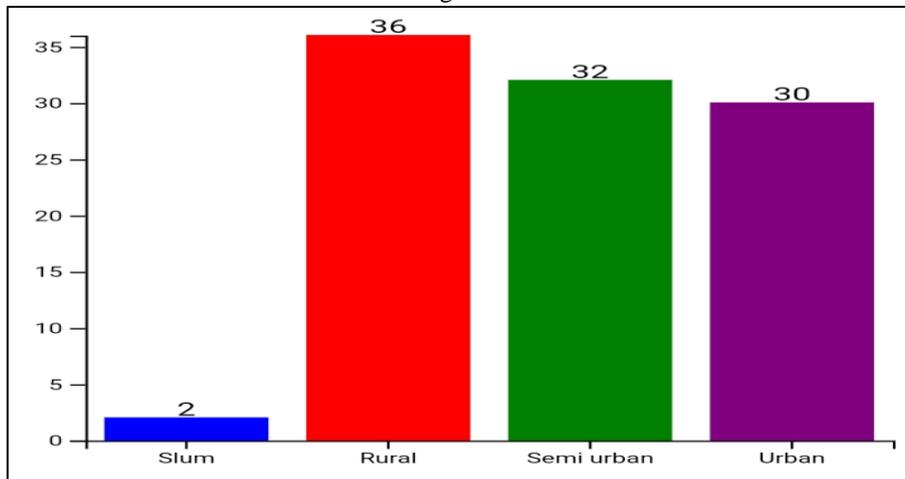


Table 3: Affected Duration

S.No.	Duration	Subjects n=336	Percentage
1	Days	156	46%
2	Weeks	170	51%
3	Months	10	3%

Figure 3

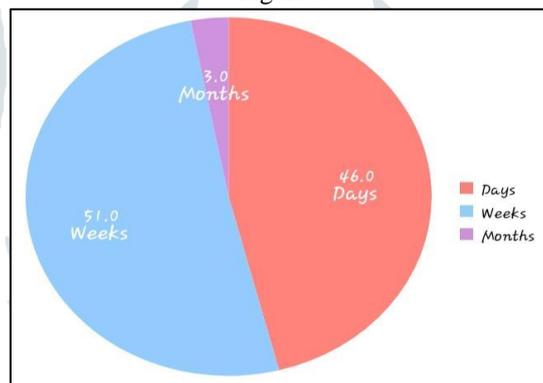


Table 4: Covid Second Wave Symptoms

S.No.	Symptoms	Subjects n=336	Percentage
1	Fever, Cold, cough	336	100%
2	Eye redness	19	6%
3	Tasteless	298	89%
4	Headache	336	100%
5	Diarrhoea	126	38%
6	Skin rashes	26	8%

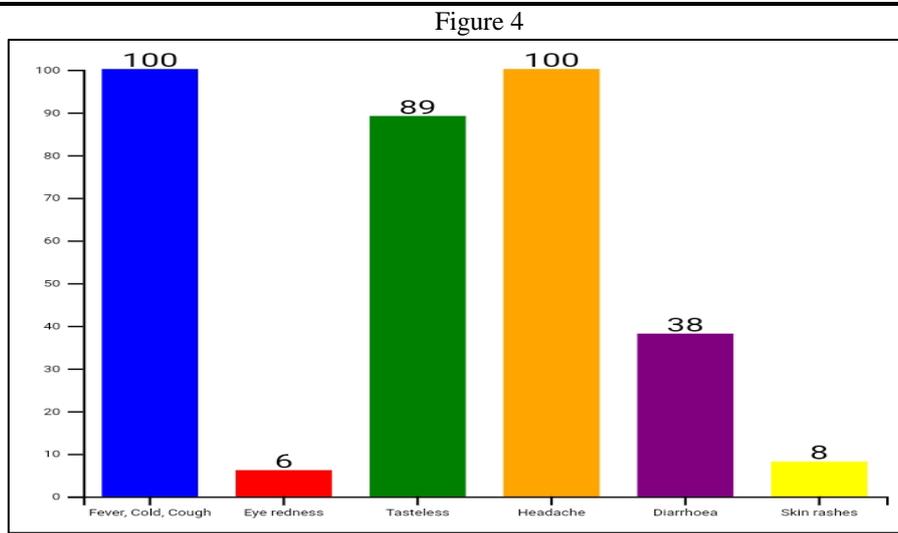


Table 5: Comorbidities

S.No.	Problems related	Subjects n=336	Percentage
1	Diabetic	102	30%
2	Blood pressure	128	38%
3	Cardiovascular diseases	30	9%
4	Lung problems	34	10%
5	Renal problems	4	1%
6	Smoking	8	2%
7	Cancer	2	0.5%

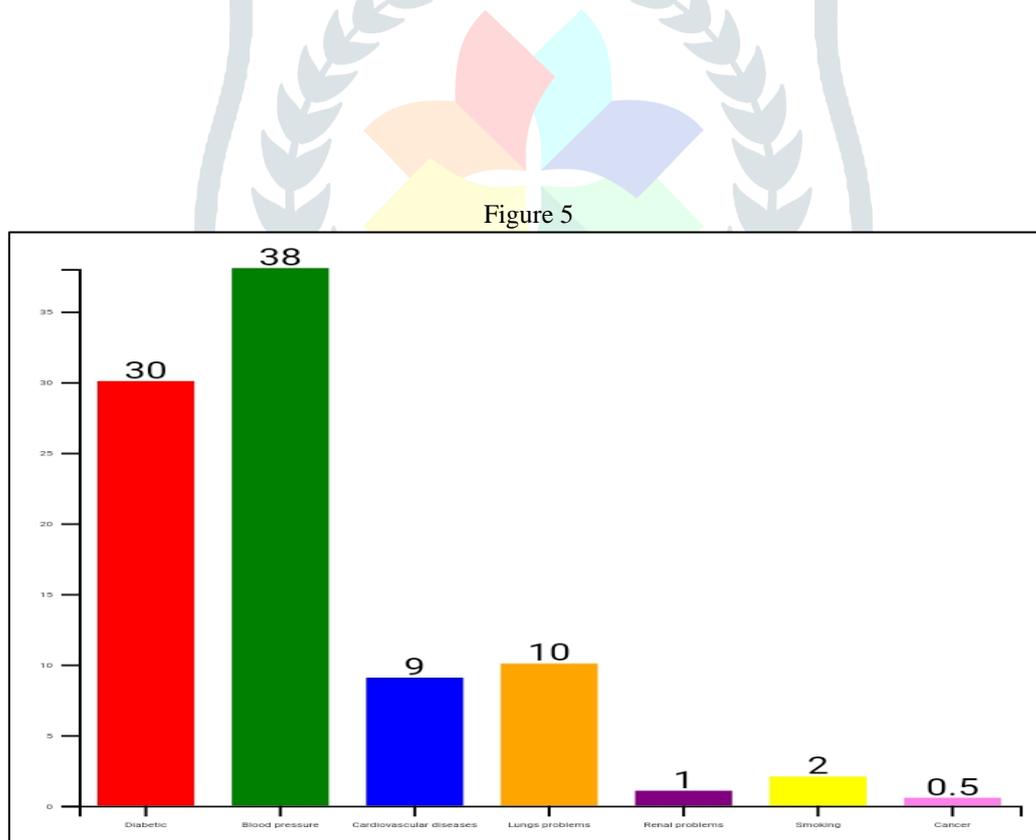


Table 6: Severity

S.No.	Severity	Subjects n=336	Percentage
1	ICU	56	17%
2	Hospitalized	62	18%
3	At home	218	65%

Figure 6

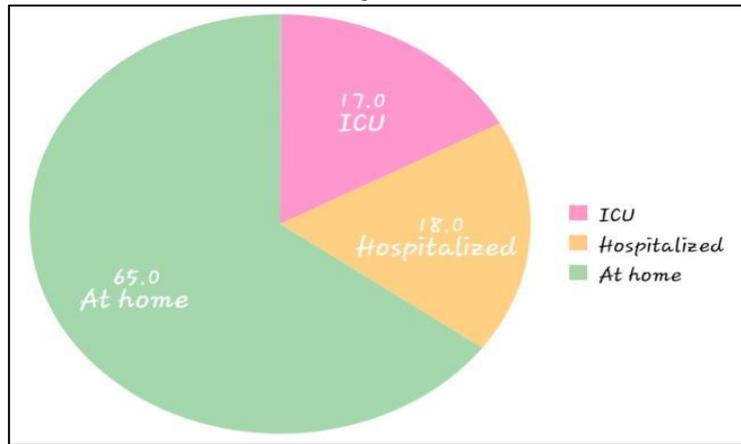


Table 7: Outcome Oxygen Support

S.NO	Duration	Subjects n=336	Percentage
1	Days	52	15%
2	Weeks	76	23%
3	Months	16	5%
4	Deaths	30	9%

Figure 7

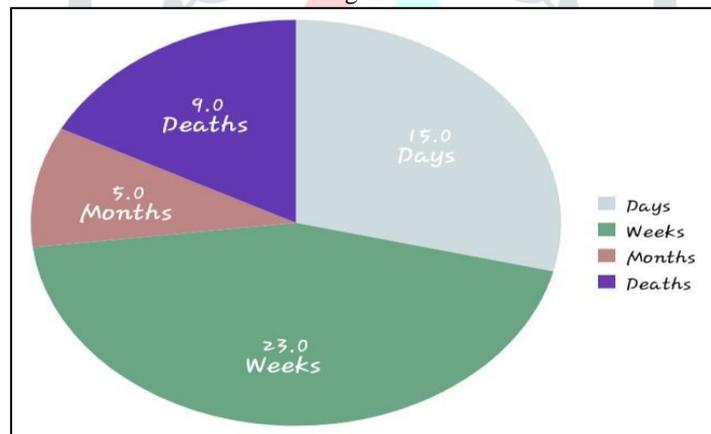
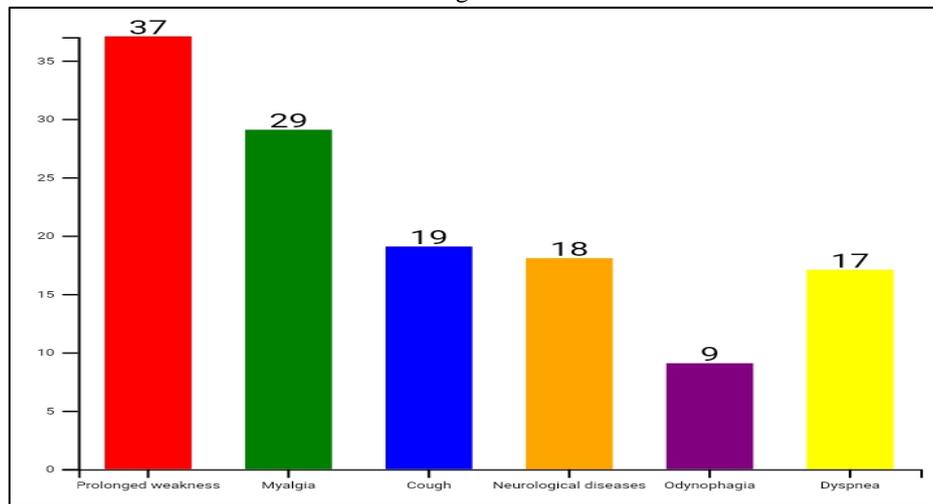


Table 8: Survival with Complications

S.No.	COMPLICATIONS	Subjects n=336	Percentage
1	Prolonged weakness	124	37%
2	Myalgia	98	29%
3	Cough	63	19%
5	Neurological diseases	61	18%
6	Odynophagia	32	9%
7	Dyspnea	56	17%

Figure 8



In this study 336 subject (190 males (57%) and 146 females (43%) with SARS-COV-2 infection.

Selected randomly were (Table:1, Fig:1). The second wave prevalence was seen significantly higher number in rural area, 120 (36%) cases observed. In Semi urban the number of cases 108 (32%), in Urban 102 (30%) but very few patients were belonged to Slum area 06 (02%) only (Table-2, Fig:2).

We noted the SARS-COV-2 affected duration patients suffered 5-7 days were 156 (46%) in weeks 170 (51%) and 10 patients (03%) were suffered one month to one and half month with this infection (Table-3, Fig:3).

Fever, Cold, Cough were the predominant compliment in all the patients 336 (100%), Pink eye (conjunctivitis) was seen in 19 patients (6%), Tasteless was observed in 298 (89%) patients, Diarrhoea was seen in 126 (38%) patients (Table-4, Fig:4)

The most relevant Comorbidities were type 2 diabetes 102 (30%), Blood pressure 128 (38%), Cardiovascular diseases and Lung diseases 34 (10%) (Table-5, Fig:5)

Patients from the second wave more frequently presented a higher frequency of cough or chills, tiredness, abdominal pain, Rural problems was observed in 4 patients (1%), smoking Lungs was noted in 8 (2%) and Cancer was seen in 2 (0.5%) (Table-5, Fig:5)

The second wave caused a significantly higher of admissions to hospital. The duration of hospitalization was significantly more in second wave (10 to 23 days).

In the study hospitalized was 62 cases 18%. ICU admitted 56 (17%) patients, cured at home was 218 (65%) (Table-6, Fig:6).

Subjects from the second wave were treated more often with non-invasive mechanical ventilation, corticoid and conventional oxygen therapy and anti-coagulate.

Regarding other treatments in the second wave received remdesivir and tocilizumab. The number of cases were required oxygen support has been observed in the second wave.

After discharged from hospital patients survived with oxygen support for 7 days were 52 (15%) for weeks 76 (23%) and for months 16 (5%). After of 30 deaths (9%) occurred.

The patients who died were The mean age of the patients was significantly lower in the second logistic regression analysis in the relationship of comorbidities with death for patients from the second were of covid-19 war type 2 diabetes and cardiovascular problem and neurology disorders.

A majority of those who were admitted to hospital with sever disease reported long-term problems including fatigue and shortness breath 56 (17%) patents were transferred to ICU. High flow nasal oxygen gives to 08 (2%).

All patients requiring oxygen support over 15l/min with reservoir make with respiratory rate above 30/min were admitted to ICU.

Outcome :

The primary outcome was 30 days mortality second outcome were 30 mortality of ICU patients' admission.

The present study will prospectively evaluate the clinical outcomes of patients discharge from the hospital patient were encouraged to contact emergency medical services of return emergency department if needed in case of coloured worsely majority of the patient are survival with complimentary prolonged weakness was observed in 124 (37%) myalgia was seen in 98 (29%). Patients are suffering with cough was seen 63 (19%) neurology diseased mainly brain fog was observed in 61(18%) patients, 32 (9%) told that having odynophagia and 56 (17%) persons having dyspnoea in post pandemic patients.

India has reported over 1.50 crop covid-19 caper since the beginning of the coronavirus pandemic. More than 1.78 lakhs people have lost their lives due to covid-19 related illness. The overall case fatuity rate in India stands at 1.42 it has been higher in the second wave at 1.52 since March 22, India witnessed a massive second surge of covid-19 cases since March 2021 after a period of decline from Sep 2020. Second wave have been seen more people developing acute shortness of breath and requiring supplemental oxygen and mechanical ventilation, second wave in India was slightly different than the first one, with higher mortality being reported in all age groups except those below 20 years. Indian journal of Medical Research (IJMR), Indian council of Medical Research (ICMR), All Indian Institute of Medical Sciences (AIIMS) and National Centre for Disease Control (NCDR) published date, which provided the current investigation. The mean age of the patients was significantly lower in the second wave with higher proportion of patients in the younger age group intervals of less than 20 year and 20-39 year the study said. It said 70% of the admitted patients were above 40 years and the proportion of males were slightly lower in second wave mortality was significantly increased in the second wave in all age groups. Study report stated that the second wave of covid-19 in India, with a younger demography, lesser co morbidities and presentation with breathlessness in greater frequency. Rapid and explosion spread of SARS- COV-2 infection during the second wave of the pandemic in India resulting in huge caseload on the entire health care system of the country.

V. DISCUSSION

In the present study total number of SARS- COV-2 patients were analysed and the result were tabulated more patents were admitted and suffered during the second wave younger and there was more death

The predominant symptoms of infection fever dyspnoea pneumonia cough were similar in both waves although the patient in the second wave presented rend and gastrointestinal symptoms more frequently cardio vascular disease diabetes at the major predicator of in hospital death

Regarding the risk factors associated with mortality showed that older age and middle age and the presence of fever dyspnoea acute and respiratory distress syndrome diabetes and cardiovascular disease chronic neurological disease were independently associated with higher mortality in the second wave. Patients in the first wave infected with SARS- COV-2 were predominantly older than 60 years and those with comorbid conditions were at increased risk of death. But in the second wave, surprisingly, younger adults appear to be more to infection and many patients have died at a young age including patient aged between 25 and 50 years, the reason why the younger population is now more vulnerable to SARS-COV-2 is not apparent and beyond current scientific explanation. However, an important observation as the situation develops is that every individual appeared to have equal risk of being infected with the virus, but the ability to sustain and overcome infection was variable among individuals. (5)

Patients in the first wave infected with SARS-CoV-2 were predominantly older than 60 years and those with comorbid conditions were at increased risk of death. But in the second wave, surprisingly, younger adults appear to be prone to infection and many patients have died at a young age, including patient aged between 26 and 50 years, the

reason why the younger population is now more vulnerable to SARS-CoV-2 is not apparent and belong current scientific explanation. However, an important observation as the situation develops is that every individual appeared to have equal risk of being infected with the virus, but the ability to sustain and overcome infection was variable among individuals. Some people with presumed suboptimal immune responses could survive and some individuals despite having presumed stronger immunity, could not overcome the rapid infection.

A further observation in the peak of the second wave was the sudden decrease in the oxygen saturation of some patients, even when they were recovering well, giving less time for the proper ventilation support. This situation created fear and panic among patients and family members as there was uncertainty around whether the patients would survive the viral infection even when showing signs of recovery. Many reasons could be behind this observation, might be presence of different strains of the SARS-CoV-2 that infect individuals simultaneously with some variants more pathogenic than others, India's poor air quality index could be a potential factor as to why spread of the infection has been severe across the country. An increase in fine particulate matter (<2.5 µm) is increased risk of COVID-19 infection. Another reason, it could be postulated that the ability of the Indian population to fight against COVID-19 is impaired because people's lungs are severely affected by the air pollution. (6)

A crucial reason for increasing deaths among individuals are who appear healthy enough to overcome SARS-CoV-2 infection could be that these individuals are prone to the effect of cytokine storms. Therefore, should propose that, in addition to focusing research on drugs and vaccines to fight against the current pandemic situation.

In the present study the main epidemiological and clinical characteristics and the mortality risk factors of the second wave more patients were admitted during the second wave they were younger alveolar older and they were more deaths in the area and whole India. The reason might be that a new variant of SARS-COV-2 infected to lungs, while deaths from clinically diagnosed respiratory infections surged too, the spout of undiagnosed deaths points to the scale of potential. Under count up of COVID-19 deaths in India. A spate of deaths from fever and respiratory destruction causes Tore through rural India in April and May and more deaths in urban areas and in private hospitals, most of the patients who died with COVID-19 were suffering with comorbidities. The predominant symptoms of infection fever, dyspnoea, pneumonia, cough, 144(43%) needed oxygen support for weeks, 76(23%) and months, 16(5%). The present study found that 56(16%) patients new were suffered with severity of the lung infection admitted ICU for months together. The study reported that in ICU patient's higher incidence of cardiovascular, 30(8%) and cardiovascular, 16(5%) impaired renal function 4 (1.2%). Regarding the risk factors associated with mortality study found that multiple regression analysis showed that in all ages the presence of fever, dyspnoea, acute respiratory diseases syndrome, diabetes, cardiovascular problems, renal problems chronic neurological diseases and cancer were independently associated with higher mortality in the second wave.

Second wave can be defined as a resurgence of the incidence rate during pandemic, which cumulatively present an exponential increase in the number of cases of the disease in a given time period and specific zone. Cases spike in areas where protocols are not followed.

The covid-19 pandemic has dramatically changed the people lives. From mandatory mask wearing to safe distancing testing tracing and isolating cases, people doing their part for the past year in their own coronavirus special edition of survivor to outwit, out play and outlast the virus virous mutant is its part of their survival tactic this process takes place when virus infects a healthy person and replicates itself in its new host. Most of the time, the mutations are small and don't affect the way the virus works but occasionally, errors occur when the virus reproduces, which is what a mutation, the extent of error increases the more times the virus reproduces. By infecting more people, the risk of replication errors increases the new virus cell starts to behave differently from its parent cell a variant occurs when the replicated virus blueprint has changed but because the change is so slight, it's behaviour is still very similar to its parent cell. But when the errors are so great that the new copy's behaviour is very different from its parent that born the new strains. The UK and Brazilian strains, strain 17 mutations have been found. While the south African strain has und institute of undergone 21 mutations.

SARS- COV-2 has spike protein, that sits outside the well of the virus, after mutation, the spike becomes" flatter so the virus can enter a human cell more easily. That means the virus is better able to evade the hosts immunity. In India only 25% of population has developed COVID-19 antibodies few percentages of people have been vaccinated; this means large section of people is still vulnerable. People should have awareness with the latest developments in testing and vaccination. In some patient's antibody levels rapidly decreased shortly after recovery from COVID-19. In one or two patients observed that positive signs of long-lasting immunity, with antibody producing cells in the bone marrow identified seven to eight months following infection with COVID-19. For some patients, post COVID brain fog goes away in about three months. But for others it can last much longer patients saying that they have trouble with memory, are easily distracted, have trouble following a conversation, and have difficulty concentrating and attending to every day responsibilities, which can negatively impact their quality-of-life patients who were diagnosed with COVID-19 in March 2021 that are still experiencing brain fog. Although these patients report improvement in their symptoms, they still are not back to baseline.

VI. LIMITATIONS OF THE STUDY

A limitation of the present study is the small sample size. This study covers a relatively small geographical area. Statistical significance for the calculations of various parameters also at the limit. This is the little information got in this area patients on this COVID -19 second wave issue. Comorbidities were type 2 diabetes, cardiovascular, GI and neurological diseases were seen in our study.

VII. CONCLUSION

The result of the present study shows that hospitalized patients in the second wave were younger, middle age and older age required more days of hospitalization, had higher mortality rates and the majority of symptoms were pneumonia, cardiovascular and chronic neurological diseases, the higher incidence of gastrointestinal symptoms in the second wave stand out as a difference. Co morbidities were high blood pressure cardiovascular and diabetes, but there were differences between those associated with mortality unknown reasons might be there in the younger patients. In the second wave severity and mortality were seen in, below 40 years old, mid above 50 years and old age patients one in three people in the world is currently being infected in India. Reasons might be due to the double mutant of the strain of SARS-COV-2 are max pathogenic than the mitral strains. These results might help to understand the characteristics of the second wave and behaviour and danger of SARS-COV-2 in this area. Patients might be neglected for eradicating virus to implement stringent measure they thought that it might be gone like fight wave within 7 days. So, delay admission in hospital or treatment (we should be strong we all need to be strong to face this second wave.

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